

Application No.:10/643,790

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Docket No.:JCLA10858-R

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In the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claim 1. (currently amended) A voltage controlled oscillator (VCO) device, suitable for use in a frequency shift keying (FSK) system, the VCO device comprising:

a switching varactor unit, having a first terminal and a second terminal, wherein the switching varactor unit has at least a first diode and a second diode, the positive ends of the first diode and the second diode are commonly coupled to a node, and the node receives a frequency-selection voltage, such that the switching varactor unit produces a capacitance according to the frequency-selection voltage; [[and]]

a VCO core, having a first output terminal, a second output terminal complementary to the first output terminal, and an input terminal, wherein the switching varactor unit is coupled in parallel with the VCO core at the first output terminal and the second output terminal to produce a capacitance effect with respect to the capacitance, so as to adjust a frequency constant \sqrt{LC} of the VCO core; and

a frequency selection unit for outputting the frequency-selection voltage, wherein the frequency selection unit comprises:

a control circuit, for receiving an input signal and a mode selection signal and outputting a control signal according to the mode selection signal;

a constant voltage generator, for generating a plurality of voltage levels; and

a selector switch, coupled to the control circuit and the constant voltage generator, for selecting one of the voltage levels to be served as the frequency-selection voltage according to the control signal.

Claim 2. (previously presented) The VCO device of claim 1, wherein the switching varactor unit comprises a switching diode unit for receiving a mode selection signal with at least one bit data, wherein the switching diode unit includes:

a plurality of diode pairs coupled in parallel, wherein the diode pairs can be switched

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on with respect to a quantity of the mode selection signal, so as to produce the capacitance, wherein the diode pair has one common terminal coupled to the node and another terminals coupled to the first terminal and the second terminal, respectively.

Claim 3. (currently amended) A frequency shift keying (FSK) system, for outputting a desired frequency, the FSK system comprising:

a frequency selection unit, for receiving an input signal and a mode selection signal, and exporting a frequency-selection voltage according to the mode selection signal, the frequency selection unit comprising:

a control circuit, for receiving the input signal and the mode selection signal and outputting a control signal according to the mode selection signal;

a constant voltage generator, for generating a plurality of voltage levels; and

a selector switch, coupled to the control circuit and the constant voltage generator, for selecting one of the voltage levels to be served as the frequency-selection voltage according to the control signal;

a switching varactor unit, having a first terminal and a second terminal, wherein the switching varactor unit has at least a first diode and a second diode, the positive ends of the first diode and the second diode are commonly coupled to a node, and the node receives the frequency-selection voltage, such that the switching varactor unit produces a capacitance according to the frequency-selection voltage; and

a VCO core, having a first output terminal, a second output terminal complementary to the first output terminal, and an input terminal, wherein the switching varactor unit is coupled in parallel with the VCO core at the first output terminal and the second output terminal to produce a capacitance effect with respect to the capacitance, so as to adjust a frequency constant \sqrt{LC} of the VCO core;

a first VCO buffer, coupled to the first output terminal of the VCO core and exporting a desired frequency;

a second VCO buffer, coupled to the second output terminal of the VCO core; and

a phase locked loop unit, coupled between an output of the second VCO buffer and the

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input terminal of the VCO core to form a feedback loop and produce the desired frequency.

Claim 4. (previously presented) The FSK system of claim 3, wherein the switching varactor unit comprises a switching diode unit for receiving the mode selection signal, wherein the switching diode unit includes:

a plurality of diode pairs coupled in parallel, wherein the diode pairs can be switched on with respect to a quantity of the mode selection signal, so as to produce the capacitance, wherein diodes of each diode pair have a common terminal coupled to the node and another terminals coupled to the first terminal and the second terminal, respectively.

Claim 5. (original) The FSK system of claim 4, wherein the diode pairs comprise bipolar junction varactor diode or metal-oxide semiconductor (MOS) varactor diode.

Claim 6. (original) The FSK system of claim 4, wherein each diode of the diode pairs also coupled with a switching device controlled by the mode selection signal.

Claim 7. (previously presented) The FSK system of claim 6, wherein the switching varactor unit further comprises a decoder to decode the mode selection signal into a plurality of channels with respect to the diode pairs for controlling the switching device, so whether each of diode pairs outputting their capacitance or not is controlled by the channels respectively.

Claim 8. (currently amended) A method to adjust an operation frequency of a voltage controlled oscillator (VCO) core, comprising

providing a voltage controlled oscillator (VCO) core, having an output terminal, a feedback output terminal complementary to the output terminal, and an input terminal, wherein the feedback output terminal and the input terminal form a feedback loop through a phase locked loop unit;

providing a switching varactor unit, for producing a capacitance with respect to a

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mode selection signal, wherein the switching varactor unit has at least a first diode and a second diode, the positive ends of the first diode and the second diode are commonly coupled to a node, and the node receives a frequency-selection voltage; and

coupling the switching varactor unit with the VCO core in parallel, so as to shift a frequency constant \sqrt{LC} of the VCO core, wherein the VCO core of a VCO device comprises a frequency selection unit for outputting the frequency-selection voltage, and the frequency selection unit comprises a control circuit, a constant voltage generator, and a selector switch, wherein the control circuit is for receiving an input signal and a mode selection signal and outputting a control signal according to the mode selection signal, the a constant voltage generator is for generating a plurality of voltage levels, and a selector switch is coupled to the control circuit and for selecting one of the voltage levels to be served as the frequency-selection voltage according to the control signal.

Claim 9. (original) The method of claim 8, wherein the mode selection signal in the switching varactor unit is decoded and turns on corresponding varactor channels of the switching varactor unit, so as to change the capacitance.

Claim 10. (canceled)

Claim 11. (previously presented) The VCO device of claim 2, wherein each diode of diode pairs also coupled with a switching device controlled by the mode selection signal.

Claim 12. (previously presented) The VCO device of claim 11, wherein the switching varactor unit further comprises a decoder to decode the mode selection signal into a plurality of channels with respect to the diode pairs for controlling the switching device, so whether each of diode pairs outputting their capacitance or not is controlled by the channels respectively.

Claim 13. (canceled)